

Antimony-Based Focal Plane Arrays for Shortwave-Infrared to Visible Applications, Phase II

Completed Technology Project (2016 - 2018)



Project Introduction

We propose to develop antimony-based focal plane arrays (FPAs) for NASA's imaging and spectroscopy applications in the spectral band from visible to shortwave-infrared (SWIR), viz. wavelengths from 0.5 - 2.5 microns. We will leverage recent breakthroughs in the performance of midwave and longwave infrared FPAs based on the InAs/GaSb/AlSb material system in which QmagiQ has played a key part. In these spectral bands, this novel sensor already offers performance comparable to mercury cadmium telluride (MCT) but at a fraction of the cost due to the leveraging of commercial growth and process equipment. Our goal is to extend that benefit into the shortwave infrared. Using the best material currently available and a novel bandgap-engineering design and process, we will fabricate FPAs and measure how the antimony-based sensor compares to state-of-the-art shortwave MCT in terms of quantum efficiency and dark current. In Phase I, we developed the basic building block - a high-performance SWIR photodiode. In Phase II, we will develop FPAs in a variety of formats and deliver them to NASA for evaluation for its astronomy and planetary missions.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
QmagiQ, LLC	Lead Organization	Industry	Nashua, New Hampshire
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	New Hampshire

Project Transitions

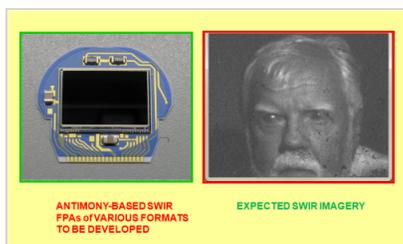
April 2016: Project Start

December 2018: Closed out

Closeout Documentation:

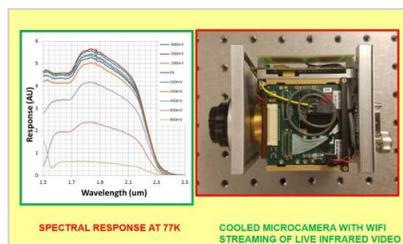
- Final Summary Chart(<https://techport.nasa.gov/file/139808>)

Images



Briefing Chart Image

Antimony-Based Focal Plane Arrays for Shortwave-Infrared to Visible Applications, Phase II (<https://techport.nasa.gov/image/132515>)



Final Summary Chart Image

Antimony-Based Focal Plane Arrays for Shortwave-Infrared to Visible Applications, Phase II (<https://techport.nasa.gov/image/129329>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

QmagiQ, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

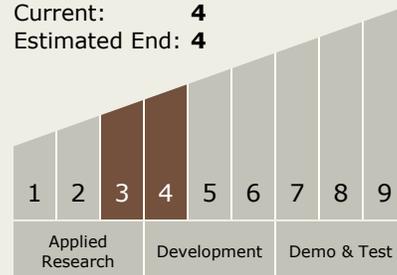
Carlos Torrez

Principal Investigator:

Mani Sundaram

Technology Maturity (TRL)

Start: **3**
 Current: **4**
 Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System